

In the application of: Penich et al.
Serial No. 10/634,433 Filed: August 5, 2003
RESPONSE TO OFFICE ACTION OF JUNE 17, 2004

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Remarks

Introduction

The following comments address the rejections set forth in the Office Action.

Comments Responsive to the Rejections under 35 USC §112 [¶2 of Office Action]

In ¶2 of the Office Action, the Primary Examiner has set forth six grounds supportive of the above rejection. Applicants comment upon each one of these grounds.

In reference to the comments about claims 1, 37 and 52, applicants have amended these claims to recite that the bonding region is closer to the surface of the substrate than the outer region. Applicants submit that these amendments clear up any ambiguity.

Regarding the comments about claims 2, 36, 38 and 53, these claims have been amended to recite that the metal is the metal in the metal nitride and/or metal aluminum nitride and/or metal aluminum carbonitride depending upon the claim. Applicants submit that these amendments clear up any ambiguity.

Claim 12 has been cancelled.

In reference to claims 13, 14 and 44, claims 13 and 14 have been amended to refer to the metal being the metal of the metal nitride and metal aluminum nitride. The reference is to the bonding region. Claim 44 has been amended to refer to the metal aluminum nitride and the metal aluminum carbonitride. The reference is to the bonding region. Applicants submit that these amendments clear up any ambiguity.

Claims 28, 46 and 60 have been amended to make the Markush Groups clear. Applicants submit that these amendments clear up any ambiguity.

Claim 30 has been amended to recite titanium so that claims 30-33 are clear. Claim 48 has been amended to recite titanium so that claims 48-51 are clear. Claim 62 has been amended to recite titanium so that claims 62-65 are clear. Applicants submit that these amendments clear up any ambiguity.

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Comments Responsive to the Rejections under 35 USC §102(b) [¶5 of Office Action]

In regard to the rejection under 35 USC § 102(b) based on U.S. Patent No. 5,700,551 to Kukino et al. or U.S. Patent No. 6,077,596 to Hashimoto, applicants respectfully submit that these rejections lack merit.

Claim 124 reads (in part):

... the coating comprising a plurality of coating sets of nanolayers wherein each coating set comprising alternating nanolayers of titanium aluminum nitride and titanium aluminum carbonitride.

As best understood, Kukino et al. does not present a specific example of a coating set that comprises alternating nanolayers of titanium aluminum nitride and titanium aluminum carbonitride. At Col. 2, lines 45-52 Kukino et al. makes a broad suggestion:

The compound whose crystal, structure is cubic system is preferably nitride, carbide or carbonitride containing at least one element selected from a group comprising Ti, Zr, Cr, V, Hf, Al and B. The compound whose crystal structure is not cubic system or of amorphous is preferably nitride, carbide or carbonitride containing at least one element selected from a group comprising Al, Si and B, in particular aluminum nitride (AlN).

But, even this suggestion does not address a coating set in which Ti is in each nanolayer.

Hashimoto does not present a specific example of a coating set that comprises alternating nanolayers of titanium aluminum nitride and titanium aluminum carbonitride. At Col. 2, lines 24-34, Hashimoto et al. makes suggestions as to the composition of the coating layers:

...Each secondary sublayer of each type includes at least one compound selected from a nitride, a carbide, a nitride carbide and an oxide including at least one element selected from periodic group 4a elements, periodic group 5A elements, Al and B, and has a thickness within the range of 1 to 50 nm. The sublayer B is formed of a single layer containing one or more compounds selected from a nitride, a carbide, a nitrided carbide, and an oxide including at least one element selected from periodic group 4A elements, periodic group 5a elements, Al and B, and has a thickness in the range of 100 to 5000 nm. ...

However, these suggestions do not address the specific claimed coating. Overall, applicants respectfully submit that neither Kukino et al. nor Hashimoto addresses the claims 124-128.

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Comments Responsive to the Rejections under 35 USC §102(b) [¶6 of Office Action]

In regard to the rejection under 35 USC § 102(b) based on U.S. Patent No. 6,102,357 to Selinder et al., applicants submit that Selinder et al. does not address claims 124-128, and especially, the feature of the titanium aluminum carbonitride as specifically recited in claim 124. While Selinder et al. makes a broad suggestion of materials at Col. 2, lines 41-50:

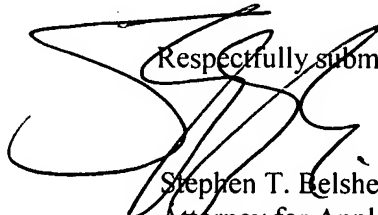
... a laminar, multilayered structure of refractory compounds in polycrystalline, non-repetitive form, MX/NX/MX/NX/MX..., where the alternating layers MX and NX are composed of metal nitrides or carbides with the metal elements M and N are selected from the group consisting of Ti, Nb, Hf, V, Ta, Mo, Zr, Cr, Al, and W and mixtures therein, where in said coating the sequence of individual layer thicknesses has no repeat period but is essentially aperiodic throughout the entire multilayered structure,...

Selinder et al. does not address the invention as claimed in claims 124-128.

Conclusion

Applicants submit that the as-amended claims are patentable. Applicants solicit the issuance of a Notice of Allowability and Notice of Issue Fee Due. If the Patent Examiner has questions or disagrees with the applicant's position, but has suggestions to place the claims in form for allowance, applicant urges the Patent Examiner to contact the undersigned attorney (615-662-0100) or Mr. John J. Prizzi at (724-539-5331).

Respectfully submitted,


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